EURORACK PRO RX1602

ENGLISH

User's Manual

Version 1.0 January 2003

www.behringer.com

BEHRINGER®
JUST LISTEN.

IMPORTANT SAFETY INSTRUCTIONS

CAUTION: To reduce the risk of electric shock, do not remove the top cover (or the rear section). No user serviceable parts inside; refer servicing to qualified personnel.

WARNING: To reduce the risk of fire or electric shock, do not expose this appliance to rain and moisture.

This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure—voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

DETAILED SAFETY INSTRUCTIONS:

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this device near water.

6) Clean only with a dry cloth.

7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10) Protect the power cord from being walked on or pinched particularly at plugs, extension cords, and the point at which they exit the unit.

11) Only use attachments/accessories specified by the manufacturer.

12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the device. When a cart is used, use caution when moving the cart/ device combination to avoid injury from stumbling over it.

13) Unplug this device during lightning storms or when not used for long periods of time.

14) Refer all servicing to qualified service personnel. Servicing is required when the unit has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the device, the unit has been exposed to rain or moisture, does not operate normally, or has been dropped.

EURORACK PRO

Professional multi-purpose 16-input ultra low-noise line mixer

- Extremely flexible keyboard and multi-purpose sub-mixer, multi-track monitoring mixer, level translator, FX return sub-mixer etc.
- 16 balanced high-headroom line inputs for individual stereo or mono use of each section
- Ultra low-noise ULN design, highest possible headroom, ultra-transparent audio
- Dedicated balance and level controls plus +4/-10 level selection per channel
- Monitor/FX send control per section with global master send control for flexible monitoring, recording or effects applications
- Illuminated double-function “mute” button per section with additional “clip” indication provides comfortable input source/level information
- Monitor/FX signal assignable to phones output for added flexibility
- Highly accurate 2 x 7-digit LED level meters and individual level control for left and right main mix signal
- 1/4" TRS main mix outputs plus easily accessible headphones output on the front panel with dedicated level control
- High-quality detented ALPS® rotary controls for long-term reliability
- Shielded toroidal power transformer for lowest noise interference
- Extremely rugged construction ensures long life even under the most demanding conditions
- Manufactured under ISO9000 certified management system

FOREWORD

Dear Customer,

welcome to the team of BEHRINGER users, and thank you very much for expressing your confidence in us by purchasing the RX1602.

Writing this foreword for you gives me great pleasure, because it represents the culmination of many months of hard work delivered by our engineering team to achieve a very ambitious goal: to develop a robust rack mixer with outstanding sound quality, all utilitzing the smallest amount of space possible. The task of designing our new RX1602 certainly meant a great deal of responsibility, which we assumed by focusing on you, the discerning user and musician. Meeting your expectations also meant a lot of work and night shifts. But it was fun, too. Developing a product usually brings a lot of people together, and what a great feeling it is when all who participated in such a project can be proud of what they've achieved.

It is our philosophy to share our enjoyment with you, because you are the most important member of the BEHRINGER team. With your highly competent suggestions for new products you've made a significant contribution to shaping our company and making it successful. In return, we guarantee you uncompromising quality as well as excellent technical and audio properties at an extremely reasonable price. All of this will enable you to give free rein to your creativity without being hampered by budget constraints.

We are often asked how we manage to produce such high-quality devices at such unbelievably low prices. The answer is quite simple: it's you, our customers! Many satisfied customers mean large sales volumes enabling us to get better purchasing terms for components, etc. Isn't it only fair to pass this benefit on to you? Because we know that your success is our success too!

I would like to thank all of you who have made the RX1602 possible. You have all made your own personal contributions, from the developers to the many other employees at this company, and to you, the BEHRINGER user.

My friends, it's been worth the effort!

Thank you very much,

Uli Behringer

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1. INTRODUCTION

Congratulations! With the EURORACK PRO RX1602, you have purchased a multifarious "problem-solver" for signal distribution. This piece of equipment was developed for those among you with the highest expectations, who are in the business of professional recording, radio and TV broadcast studios, PA and home recording situations, etc. The RX1602's extensive range of possibilities make it ideal for routing separate signals to a single stereo output (mixer), or for signal level adjustment of individual signals (level translator)—all these functions can be achieved by using the EURORACK PRO RX1602.

Future-oriented BEHRINGER technology

Our rack mixer's technology is based on experience and insights spanning many years, delving into the fields of audio technology already used worldwide in countless studios as well as radio and TV applications.

To allow for the highest possible level of operational safety, we manufacture our equipment under the highest quality standards in the industry. Your RX1602 has been manufactured under ISO9000 certified management system.

Balanced inputs

The BEHRINGER RX1602 features electronically servo-balanced inputs. The automatic servo function detects when unbalanced jacks are connected, and internally adjusts the signal level so that no level difference between input and output signals occurs (6 dB correction).

☞ **The following user's manual is intended to familiarize you with the unit's control elements, so that you can master all the functions. After having thoroughly read the user's manual, store it at a safe place for future reference.**

1.1 Before you get started

1.1.1 Shipment

The RX1602 was carefully packed at the factory to assure secure transport. Should the condition of the cardboard box suggest that damage may have taken place, please inspect the unit immediately and look for physical indications of damage.

☞ **Damaged units should NEVER be sent directly to us. Please inform the dealer from whom you acquired the unit immediately as well as the transportation company from which you took delivery of the unit. Otherwise, all claims for replacement/repair may be rendered invalid.**

1.1.2 Initial operation

Please make sure the unit is provided with sufficient ventilation, and never place the EURORACK on top of an amplifier or in the vicinity of a heater to avoid the risk of overheating.

☞ **Before plugging the unit into a power socket, please make sure you have selected the correct voltage:**

The fuse compartment near the power plug socket contains three triangular markings. Two of these triangles are opposite one another. The voltage indicated adjacent to these markings is the voltage to which your unit has been set up, and can be altered by rotating the fuse compartment by 180°. **ATTENTION: This does not apply to export models that were for example manufactured only for use with 120 V!**

☞ **If you alter the unit's voltage, you must change the fuse accordingly. The correct value of the fuse needed can be found in the chapter "SPECIFICATIONS".**

☞ **Faulty fuses must be replaced with fuses of appropriate rating without exception! The correct value of the fuses needed can be found in the chapter "SPECIFICATIONS".**

Power is delivered via the cable enclosed with the unit. All requiered safety precautions have been adhered to.

☞ **Please make sure that the unit is grounded at all times. For your own protection, you should never tamper with the grounding of the cable or the unit itself.**

1.1.3 Warranty

Please take a few minutes and send us the completely filled out warranty card within 14 days of the date of purchase. You may also register online at www.behringer.com. The serial number needed for the registration is located at the top of the unit. Failure to register your product may void future warranty claims.

1.2 The user's manual

The user's manual is designed to give you both an overview of the control elements, as well as detailed information on how to use them. In order to help you understand the links between the controls, we have arranged them in groups according to their function. If you need to know more about specific issues, please visit our website at www.behringer.com, where you'll find additional information on mixing consoles, effects units and dynamic processors.

2. CONTROL ELEMENTS AND CONNECTIONS

In this chapter we go about describing all control elements of your EURORACK PRO RX1602. All controls and connectors will be explained in full detail. You will also receive useful information about possible applications.

2.1 Channel section

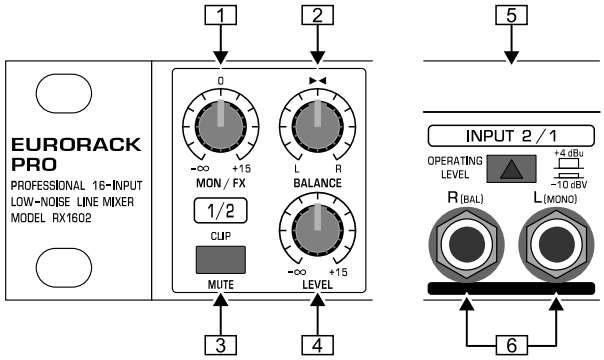

Fig. 2.1: Control elements of the channel section

1 Use the *MON/FX* control to set the signal level of the respective channel for monitoring or effects purposes. You can take the MON/FX signal at the MON OUT SEND connector 14. The MON/FX SEND control 7 of the main section governs the overall MON/FX SEND signal level.

2 By using the *BALANCE* control, you can

- set up the position of mono signals in the stereo image, and

- regulate the ratio of left/right channel signals when processing stereo signals.

3 The *MUTE* switch is used to interrupt the signal path, thus muting the respective channel. When pressed (signal muted) the switch is lit red.

When the MUTE switch is not depressed, the red light functions as *CLIP* display, indicating when the input signal level is too high (>+17 dBu). To avoid distortion, please reduce the signal level using the LEVEL control 4 in case the CLIP indicator is frequently or permanently lit.

4 To increase or reduce the input signal level, use the *LEVEL* control (increase up to +15 dB, reduce all the way down to -∞).

Similarly, use the LEVEL controls of the channel sections to regulate the channel's signal level present in the main mix.

5 Use the *OPERATING LEVEL* switch located on the rear of your RX1602 to individually adjust each channel to the output signal level of your equipment. When the switch is depressed (-10 dBV), the inputs are more sensitive.

6 These are the inputs of the channel sections on balanced 1/4" TRS connectors. Of course, you can connect mono jacks (unbalanced operation). To use a channel for a mono signal, please connect the signal source to the left input.

2.2 Main section

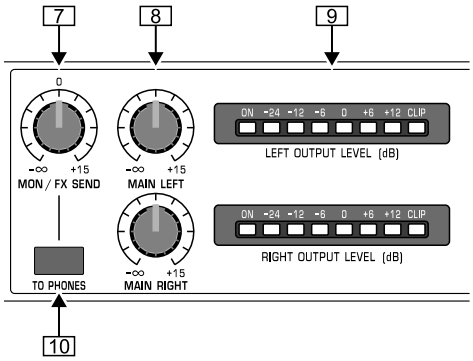

Fig. 2.2: Main section

7 Use the *MON/FX SEND* control to set the signal level of those signals that are routed to the MON OUT SEND connector 14 for monitoring or effects applications.

8 The left signal portion of the mix created using the LEVEL and BALANCE controls of each channel is set using the *MAIN LEFT* control.

The right signal portion of the mix is correspondingly adjusted using the *MAIN RIGHT* control. Amplification of up to +15 dB is possible on both controls.

9 You can easily get a readout of both channels by observing the highly acurate 7-digit level meters labeled *LEFT OUTPUT LEVEL* and *RIGHT OUTPUT LEVEL*.

GAIN SETTING:
To correctly set the input gain of a channel, please press the MUTE switch 3 of the remaining channels.

When recording with digital multi-channel recorders, the peak meter on the recorder should not reach over 0 dB. This is because unlike with digital recordings, even the smallest amount of distortion can lead to unpleasant-sounding end result.

With analog recorders, the VU meters of the recording device should read roughly up to +3 dB in case of low-frequency signals (e.g. bass drum). Because of their inherent inertia, VU meters tend to display levels of signals with frequencies of above 1 kHz too low. Therefore, when using instruments such as a hi-hat, you should set the input gain only up to -10 dB. Snare drums should be set up to roughly 0 dB.

☞ **The peak meters of your EURORACK PRO display the level virtually frequency-independent. A recording level of 0 dB is recommended for all kinds of signals.**

10 The *TO PHONES* switch gives you the option to feed the signals routed to the monitor/effects bus into your headphones for control purposes.

ATTENTION!

☞ **We would like to bring your attention to the fact that high volume levels may damage your hearing and/or your headphones. Please turn the MAIN LEFT and MAIN RIGHT controls as well as the PHONES control in the main section all the way to the left before powering up the unit. Please always pay keen attention to an <u>appropriate</u> volume level.**

11 The *LEVEL* control in the MAIN section governs the volume level of your headphones.

Please connect your headphones to the PHONES connector. It is a standard 1/4" TRS stereo connector.

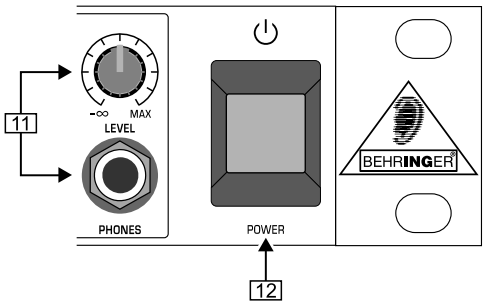

Fig. 2.3: POWER switch, LEVEL control and PHONES connector

12 Use the *POWER* switch to power up your RX1602. The POWER switch should always be in the "Off" position when you are about to connect your unit to the mains.

☞ **Attention: The POWER switch does not fully disconnect the unit from the mains. Unplug the power cord completely when the unit is not used for prolonged periods of time.**

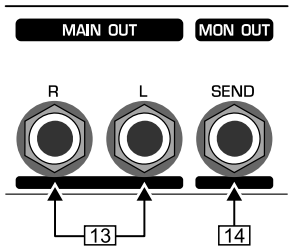

Fig. 2.4: MAIN OUT and MON OUT SEND connectors

13 The *MAIN OUT* connectors come as balanced 1/4" TRS jacks. The main mix signal (derived from all channels) is present here. You can set the output signal level by using the MAIN LEFT and MAIN RIGHT controls 8 (reducing all the way down to -∞, increasing up to +15 dB). The main mix signal can be used to feed your mixing console or stereo amplifier, among others.

14 The monitor signal can be taken at the *MON OUT SEND* connector (1/4" TRS connector). It is just as well-suited for being used with effects applications.

2.3 Mains connection

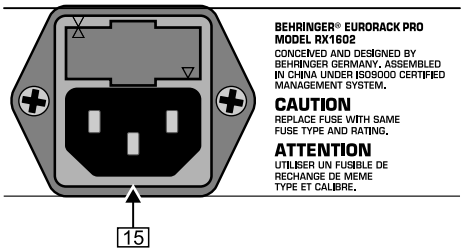

Fig. 2.5: Mains connector with integrated fuse compartment

15 The mains connection is achieved via the standard IEC connector. A matching power cord is included.

FUSE COMPARTMENT/VOLTAGE SELECTION: Before plugging the unit into a power socket, please make sure you have selected the correct voltage. Faulty fuses must be replaced with fuses of appropriate rating without exception. Some units feature a fuse compartment that can be operated in two different positions, allowing

alternating between 230 V and 120 V. Attention: when using the unit outside of Europe (running on 120 V), you have to implement a fuse with a higher rating.

SERIAL NUBMER. The serial number is located on the top of the unit. Please take a few minutes and send to us a completely filled out warranty card within 14 days of the original date of purchase. Otherwise, warranty claims may be rendered invalid. Or fill out the warranty information online at www.behringer.com.

3. APPLICATIONS

3.1 Keyboards sub-mixer

Very often, keyborards feature a stereo design, their signals are already pre-amplified and require no sound processing. To avoid using valuable channels of your main mixer for a purpose other than processing mic signals, you can instead use your RX1602 as a sub-mixer.

In this case, the output signals of keyboards, samplers or similar sound sources are connected to the inputs 6 of the RX1602. You can route the MAIN OUTs of your RX1602 into your main mixer via the aux returns or a stereo channel.

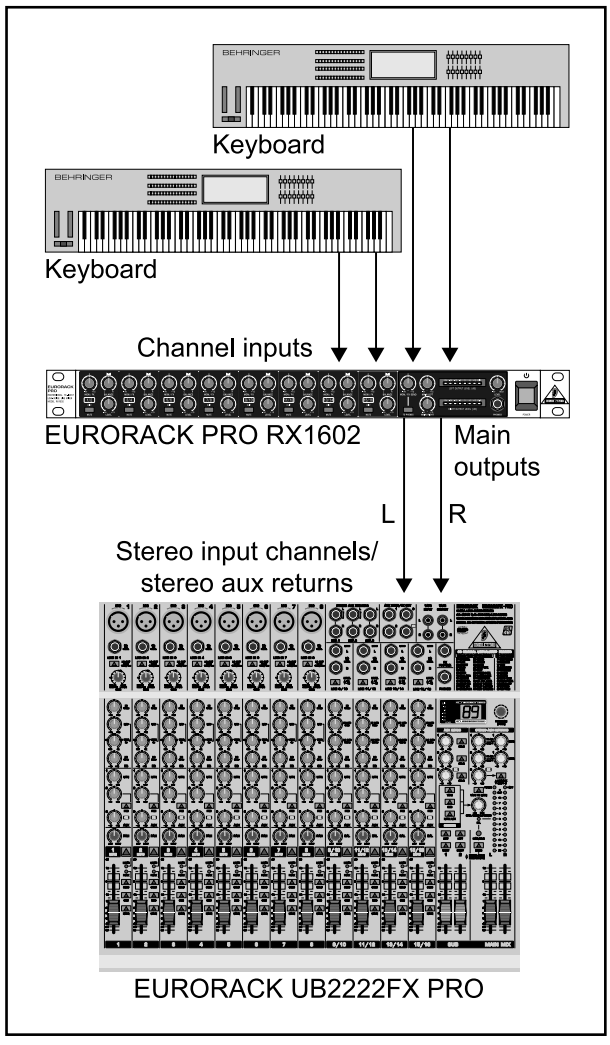

Fig. 3.1: Keyboard sub-mix using the RX1602

3.2 Sub-mix with samplers

Those of you who work with hardware samplers in studio environments, and who combine many outputs of these units on a single RX1602, can save yourselves a lot of frequent plugging in and out of cables. At the same time, you get a practical way to adjust the signal level to various recording equipment inputs. Last but not least, you also get an extra effects bus.

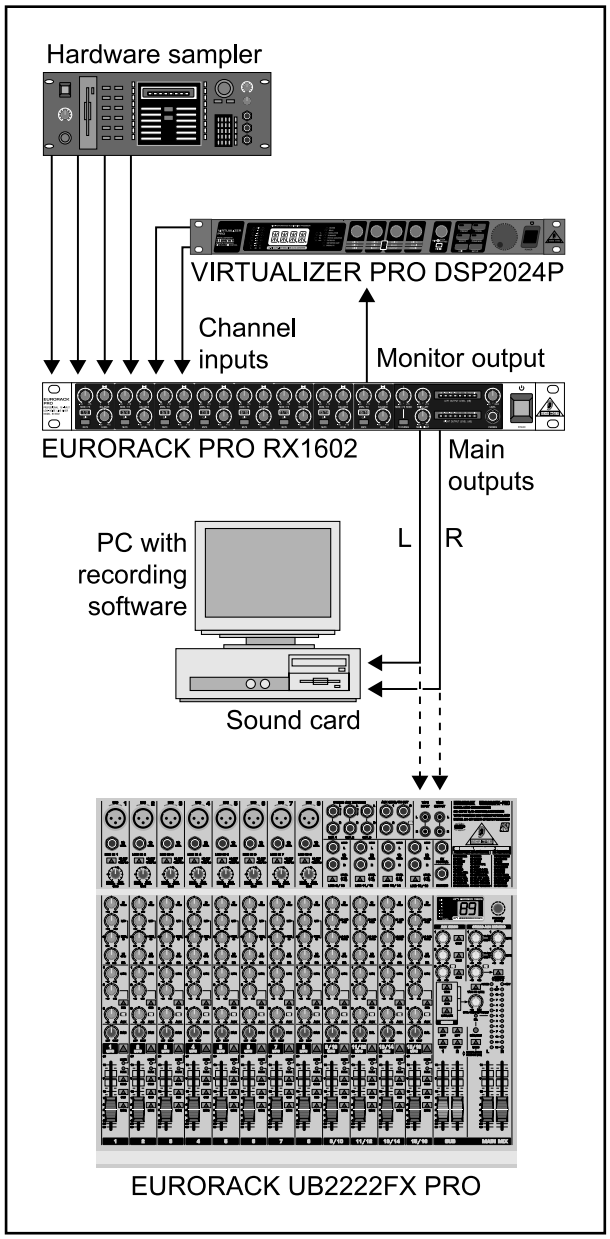

Fig. 3.2: Sampler/PC application

3.3 Monitoring multi-track recorders

Professional sound cards and multi-track recorders can replay several tracks simultaneously. For this purpose, your RX1602 can be ideally used as a space-saving monitor mixer.

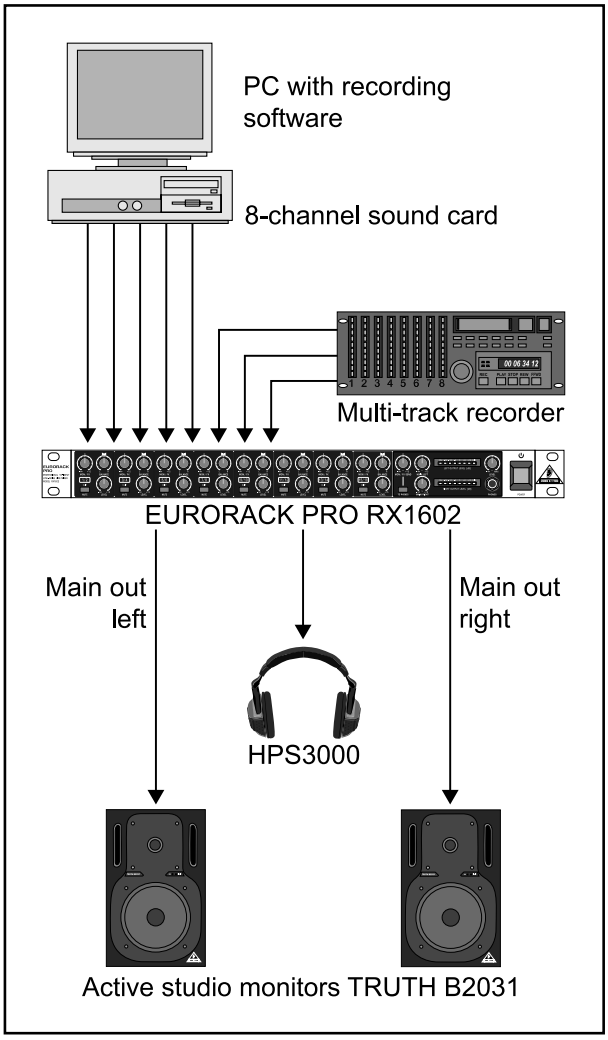

Fig. 3.3: Monitoring multi-track recorders or multi-channel sound cards

3.4 Small live setup

Compact and powerful, feature-rich equipment is optimal for musicians who spend a lot of their time on the road. Fig. 3.4 shows an example of a compact solution for keyboard and vocal amplification, whereby a singing guitar player or an additional musician can easily be integrated into the mix.

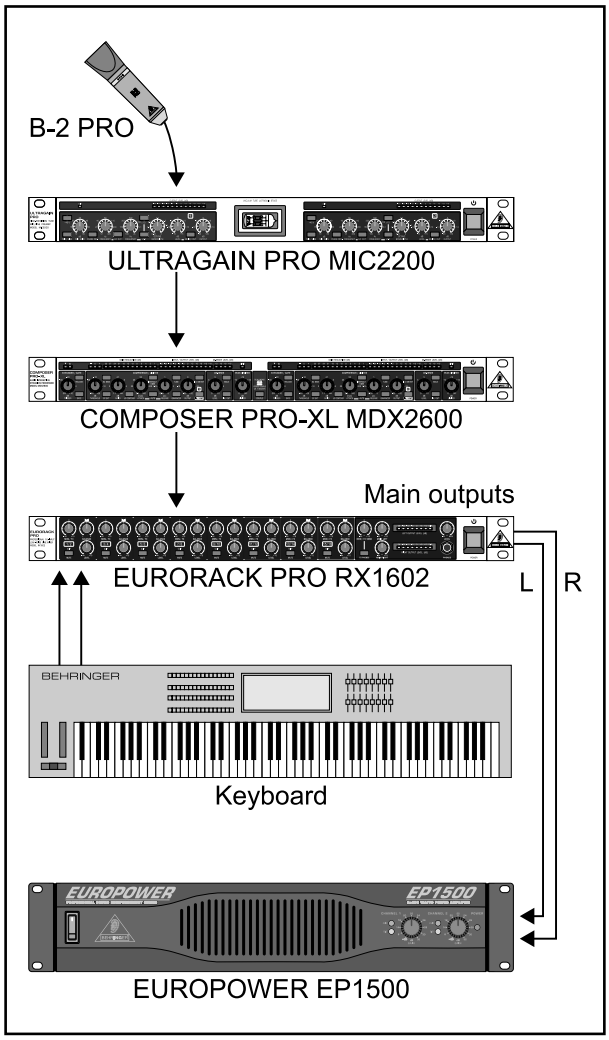

Fig. 3.4: Expandable small live setup

4. INSTALLATION

4.1 Rack mounting

The BEHRINGER EURORACK PRO RX1602 requires one height unit (1 HU) for being installed into a 19" rack. Please allow at least an extra 4" of space for the connectors on the rear panel.

Also, please make sure that sufficient ventilation of the unit is provided for, and never put the rack mixer onto an amp or similar equipment to avoid overheating.

4.2 Audio connections

You will require several types of cables for the various kinds of connections possible. The following illustrations show you how to wire different cables. Always use high-quality cables.

The audio inputs of the RX1602 are electronically balanced to avoid hum problems.

Of course, you can also connect equipment featuring un-balanced outputs. To this end, use either mono jacks or connect ring and sleeve of the stereo jack (bridge pin 1 and pin 3 when using XLR connectors).

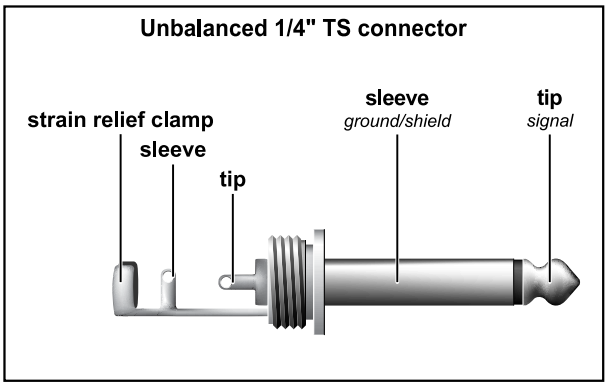

Fig. 4.1: 1/4" TS connector

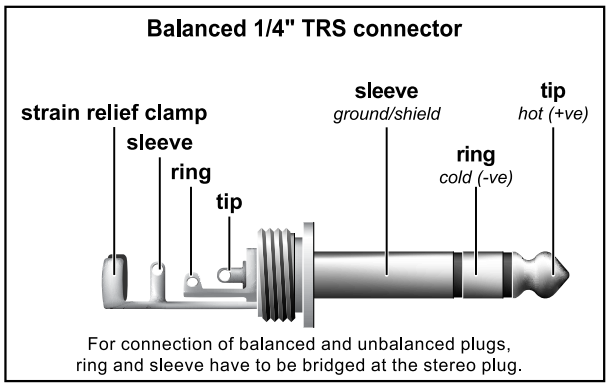

Fig. 4.2: 1/4" TRS connector

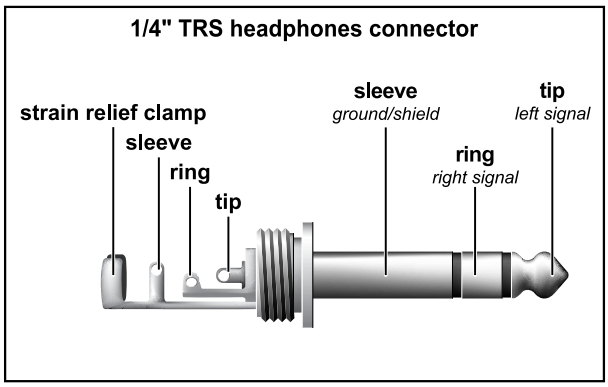

Fig. 4.3: 1/4" TRS connector for headphones operation

5. SPECIFICATIONS

AUDIO INPUTS	
INPUT L/R	
Type	1/4" TRS connector, electronically balanced
Impedance	approx. 20 kΩ balanced, 10 kΩ unbalanced
Gain range	-∞ to +15 dB
Operating level	variable, +4 dBu/-10 dBV (switchable)
Max. input level	+22 dBu
Common-mode rejection CMRR @ 1 kHz	typ. 44 dB
AUDIO OUTPUTS	
MAIN OUT L/R	
Type	1/4" TRS connector, unbalanced
Gain range	-∞ to +15 dB
Impedance	approx. 120 Ω
Max. output level	+22 dBu
MON OUT	
Type	1/4" TRS connector, unbalanced, mono
Impedance	approx.120 Ω
Max. output level	+22 dBu
PHONES output	
Type	1/4" TRS connector, stereo
Minimum load impedance	100 Ω
SYSTEM SPECIFICATIONS	
Bandwidth	20 Hz - 20 kHz +/-0.2 dB
Frequency range	20 Hz - 200 kHz +0/-3 dB
Signal-to-noise ratio	< -97 dB
THD	0.0025% @ +4 dB input 1 kHz gain 1
Crosstalk	< -70 dB
POWER SUPPLY	
Voltage	USA/Canada 120 V~, 60 Hz Europe/U.K./Australia 230 V~, 50 Hz Japan 100 V~, 50 - 60 Hz General export model 120/230 V~, 50 - 60 Hz
Power consumption	max. 14 W
Fuse	100 - 120 V~: **T 250 mA H** 200 - 240 V~: **T 160 mA H**
Mains connection	Standard IEC connector
DIMENSIONS/WEIGHT	
Dimensions	approx. 1 3/4" (44.5 mm) x 19" (482.6 mm) x 8 1/2" (217 mm)
Weight	approx. 2.30 kg (5.07 lbs)
Shipping weight	approx. 3.55 kg (7.83 lbs)

BEHRINGER is constantly striving to maintain the highest professional standards. As a result of these efforts, modifications may be made from time to time to existing products without prior notice. Specifications and appearance may differ from those listed or illustrated.

6. WARRANTY

§ 1 WARRANTY CARD/ONLINE REGISTRATION

To be protected by the extended warranty, the buyer must complete and return the enclosed warranty card within 14 days of the date of purchase to BEHRINGER Spezielle Studiotechnik GmbH, in accordance with the conditions stipulated in § 3. Failure to return the card in due time (date as per postmark) will void any extended warranty claims. Based on the conditions herein, the buyer may also choose to use the online registration option via the Internet (www.behringer.com or www.behringer.de).

§ 2 WARRANTY

1. BEHRINGER (BEHRINGER Spezielle Studiotechnik GmbH including all BEHRINGER subsidiaries listed on the enclosed page, except BEHRINGER Japan) warrants the mechanical and electronic components of this product to be free of defects in material and workmanship for a period of one (1) year* from the original date of purchase, in accordance with the warranty regulations described below. If the product shows any defects within the specified warranty period that are not excluded from this warranty as described under § 3 and 4, BEHRINGER shall, at its discretion, either replace or repair the product using suitable new or reconditioned parts. In the case that other parts are used which constitute an improvement, BEHRINGER may, at its discretion, charge the customer for the additional cost of these parts.

2. If the warranty claim proves to be justified, the product will be returned to the user freight prepaid.

3. Warranty claims other than those indicated above are expressly excluded.

§ 3 RETURN AUTHORIZATION NUMBER

1. To obtain warranty service, the buyer (or his authorized dealer) must call BEHRINGER (see enclosed list) during normal business hours **BEFORE** returning the product. All inquiries must be accompanied by a description of the problem. BEHRINGER will then issue a return authorization number.

2. Subsequently, the product must be returned in its original shipping carton, together with the return authorization number to the address indicated by BEHRINGER.

3. Shipments without freight prepaid will not be accepted.

§ 4 WARRANTY REGULATIONS

1. Warranty services will be furnished only if the product is accompanied by a copy of the original retail dealer's invoice. Any product deemed eligible for repair or replacement by BEHRINGER under the terms of this warranty will be repaired or replaced within 30 days of receipt of the product at BEHRINGER.

2. If the product needs to be modified or adapted in order to comply with applicable technical or safety standards on a national or local level, in any country which is not the country for which the product was originally developed and manufactured, this modification/adaptation shall not be considered a defect in materials or workmanship. The warranty does not cover any such modification/adaptation, irrespective of whether it was carried out properly or not. Under the terms of this warranty, BEHRINGER shall not be held responsible for any cost resulting from such a modification/adaptation.

3. Free inspections and maintenance/repair work are expressly excluded from this warranty, in particular, if caused by improper handling of the product by the user. This also applies to defects caused by normal wear and tear, in particular, of faders, potentiometers, keys/buttons and similar parts.

4. Damages/defects caused by the following conditions are not covered by this warranty:

- ▲ improper handling, neglect or failure to operate the unit in compliance with the instructions given in BEHRINGER user or service manuals.
- ▲ connection or operation of the unit in any way that does not comply with the technical or safety regulations applicable in the country where the product is used.
- ▲ damages/defects caused by force majeure or any other condition that is beyond the control of BEHRINGER.

5. Any repair or opening of the unit carried out by unauthorized personnel (user included) will void the warranty.

6. If an inspection of the product by BEHRINGER shows that the defect in question is not covered by the warranty, the inspection costs are payable by the customer.

7. Products which do not meet the terms of this warranty will be repaired exclusively at the buyer's expense. BEHRINGER will inform the buyer of any such circumstance. If the buyer fails to submit a written repair order within 6 weeks after notification, BEHRINGER will return the unit C.O.D. with a separate invoice for freight and packing. Such costs will also be invoiced separately when the buyer has sent in a written repair order.

§ 5 WARRANTY TRANSFERABILITY

This warranty is extended exclusively to the original buyer (customer of retail dealer) and is not transferable to anyone who may subsequently purchase this product. No other person (retail dealer, etc.) shall be entitled to give any warranty promise on behalf of BEHRINGER.

§ 6 CLAIM FOR DAMAGES

Failure of BEHRINGER to provide proper warranty service shall not entitle the buyer to claim (consequential) damages. In no event shall the liability of BEHRINGER exceed the invoiced value of the product.

§ 7 OTHER WARRANTY RIGHTS AND NATIONAL LAW

1. This warranty does not exclude or limit the buyer's statutory rights provided by national law, in particular, any such rights against the seller that arise from a legally effective purchase contract.

2. The warranty regulations mentioned herein are applicable unless they constitute an infringement of national warranty law.

* Customers in the European Union please contact BEHRINGER Germany Support for further details.

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